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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/788,503	02/21/2001	Hideki Tanaka	00N033-US	6750
21254	7590	03/04/2004	EXAMINER	
MCGINN & GIBB, PLLC 8321 OLD COURTHOUSE ROAD SUITE 200 VIENNA, VA 22182-3817			NGUYEN, KHIEM D	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/788,503

Applicant(s)

TANAKA, HIDEKI

Examiner

Khiem D Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 December 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11,13-15,17,18 and 21-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11,13-15,17,18 and 21-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

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## **DETAILED ACTION**

### ***Response to Amendment***

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-11, 13-15, 17, 18, and 21-35 have been considered but are moot in view of the new ground(s) of rejection.

### ***New Grounds of Rejection***

#### ***Specification***

Claim 17 is objected to because of the following informalities: Claim 17 depends on the canceled claim 16. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-9, 22, 23, 25, 28, 29, and 30-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muramatsu (JP 05-323355) in view of Kang (U.S. Patent 6,559,522).

In re claim 1, **Muramatsu** discloses a tape carrier type semiconductor device comprising (See **FIGS. 1-10** and related text): a flexible substrate on whose surface wiring is formed; and a driver circuit (**FIG. 2: 2**) which is mounted on the flexible substrate (**FIG. 5: 8**) and drives a device connected to the flexible substrate, wherein the flexible substrate includes: the slits (**FIG. 5: 5**) having no connector, for folding the flexible substrate.

Muramatsu does not explicitly disclose a first slit for releasing stress, the first slit having a connector situated intermediate thereto for connecting both sides of the first slit to reduce warpage. Kang discloses a tape carrier type semiconductor device comprising (col. 3, line 7 to col. 4, line 16 and **FIGS. 1-3**): a flexible substrate on whose surface wiring is formed; and a driver circuit (**FIG. 3: 50**) which is mounted on the flexible substrate (**FIG. 3: 10**) and drives a device connected to the flexible substrate, wherein the flexible substrate includes: a first slit (**FIG. 3: 16a and 16b**) for releasing stress, the first slit having a connector situated intermediate thereto for connecting both sides of the first slit to reduce warpage (col. 3, line 53 to col. 4, line 16). It would have been obvious to one of ordinary skill in the art of making semiconductor devices to combine the teaching of Muramatsu and Kang to enable the first slit for releasing stress of Muramatsu to be formed and furthermore to reduce the stress (col. 3, lines 53-58).

In re claim 2, Kang discloses wherein the first slit includes a plurality of connectors (**FIGS. 1-3**).

In re claim 3, Kang discloses wherein parts of the slit, which are separated from each other at the connector, are diverged from each other at the connector in a direction perpendicular to the slit (**FIGS. 1-3**).

In re claim 4, Kang discloses wherein the flexible substrate includes a plurality of first slits (**FIG. 3: 16a and 16b**).

In re claim 5, Muramatsu discloses wherein the flexible substrate includes a second slit for folding the tape carrier type semiconductor device (**FIG. 5**).

In re claims 6 and 8, Muramatsu discloses wherein the flexible substrate includes a rib (**FIG. 5: 1**) comprises a reinforcement rib which is formed substantially perpendicular to the plurality of first slits.

In re claims 7 and 9, Muramatsu discloses a portion of the flexible substrate is changed in shape, thereby to form the rib (**FIG. 5**).

In re claim 22, Muramatsu discloses wherein the flexible substrate comprises a terminal area adjacent the first slit (**FIGS. 5-10**).

In re claim 23, Muramatsu discloses wherein the first slit is situated between the driver circuit and the terminal area, and wherein the first slit comprises a rectangular shape with a longitudinal side parallel to the terminal area (**FIGS. 5-10**).

In re claim 25, Muramatsu in view of Kang discloses wherein the first slit and the second slit are formed on opposing sides of the driver circuit (Muramatsu, **FIGS. 5**) and Kang (**FIGS. 1-3**).

In re claim 28, Muramatsu discloses wherein the flexible substrate includes a rib (**FIG. 5, 1**) comprises a reinforcement rib.

In re claim 29, Muramatsu discloses wherein the rib has at least one of a concave and a convex shape (**FIGS. 3-5**).

In re claim 30, Kang discloses wherein the first slit comprises a thermal stress-releasing slit (**FIGS. 1-3**).

In re claim 31, Kang discloses wherein the flexible substrate comprises a terminal area substantially adjacent to the first slit and the print substrate (**FIGS. 1-3**).

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In re claim 32, **Kang** discloses wherein the flexible substrate comprises a terminal area, the first slit is situated between the driver circuit and the terminal area (**FIGS. 1-3**).

In re claim 33, there is no evidence indicating the length of the first slit and the connector is critical and it has been held that it is not inventive to discover the optimum or workable length of a result-effective variable within given prior art conditions by routine experimentation. See MPEP §2144.05.

In re claim 34, **Kang** discloses wherein said flexible substrate comprises a plurality of first slits (**FIG. 3: 16a and 16b**), which are oriented in an off-set pattern to diverge from a straight line (**FIGS. 1-3**).

In re claim 35, **Kang** discloses wherein the flexible substrate is connected to a print substrate, the first slit is substantially adjacent to the driver circuit and the print substrate (**FIGS. 1-3**).

2. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muramatsu (JP 05-323355) in view of Kang (U.S. Patent 6,559,522).

In re claim 10, **Muramatsu** discloses a tape carrier type semiconductor device comprising (See **FIGS. 1-10** and related text): a flexible substrate on whose surface wiring is formed; and a driver circuit (**FIG. 2: 2**) which is mounted on the flexible substrate (**FIG. 5: 8**) and drives a device connected to the flexible substrate, wherein the flexible substrate includes: the slits (**FIG. 5: 5**) having no connector, for folding the flexible substrate; and a rib formed substantially perpendicular to the slits.

Muramatsu does not explicitly disclose a first slit for releasing stress in flexible substrate, the first slit having a connector for connecting both sides of the first slit. Kang

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discloses a tape carrier type semiconductor device comprising (col. 3, line 7 to col. 4, line 16 and **FIGS. 1-3**): a flexible substrate on whose surface wiring is formed; and a driver circuit (**FIG. 3: 50**) which is mounted on the flexible substrate (**FIG. 3: 10**) and drives a device connected to the flexible substrate, wherein the flexible substrate includes: a first slit (**FIG. 3: 16a and 16b**) for releasing stress in flexible substrate, the first slit having a connector for connecting both sides of the first slit (col. 3, line 53 to col. 4, line 16). It would have been obvious to one of ordinary skill in the art of making semiconductor devices to combine the teaching of Muramatsu and Kang to enable the first slit for releasing stress of Muramatsu to be formed and furthermore to reduce the stress (col. 3, lines 53-58).

In re claim 11, Muramatsu discloses a portion of the flexible substrate is changed in shape, thereby to form the rib (**FIG. 5**).

3. Claims 13, 14, 15, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muramatsu (JP 05-323355) in view of Kang (U.S. Patent 6,559,522).

In re claim 13, Muramatsu discloses a flexible substrate, comprising (See **FIGS. 1-10** and related text): a flexible substrate on whose surface wiring is formed; and a driver circuit (**FIG. 2: 2**) which is mounted on the flexible substrate (**FIG. 5: 8**) and drives a device connected to the flexible substrate, wherein the flexible substrate includes: the slits (**FIG. 5: 5**) having no connector, for folding the flexible substrate.

Muramatsu does not explicitly disclose a first slit for releasing stress, the first slit having a connector thereto for connecting both sides ends of the first slit, and on whose surface wiring having a predetermined pattern is formed.

**Kang** discloses a tape carrier type semiconductor device comprising (col. 3, line 7 to col. 4, line 16 and **FIGS. 1-3**): a flexible substrate on whose surface wiring is formed; and a driver circuit (**FIG. 3: 50**) which is mounted on the flexible substrate (**FIG. 3: 10**) and drives a device connected to the flexible substrate, wherein the flexible substrate includes: a first slit (**FIG. 3: 16a and 16b**) for releasing stress, the first slit having a connector thereto for connecting both sides ends of the first slit (col. 3, line 53 to col. 4, line 16), and on whose surface wiring having a predetermined pattern is formed. It would have been obvious to one of ordinary skill in the art of making semiconductor devices to combine the teaching of Muramatsu and Kang to enable the first slit for releasing stress of Muramatsu to be formed and furthermore to reduce the stress (col. 3, lines 53-58).

In re claim 14, **Kang** discloses wherein the first slit includes a plurality of connectors (**FIGS. 1-3**).

In re claim 15, **Kang** discloses wherein parts of the slit, which are separated from each other at the connector, are diverged from each other at the connector in a direction perpendicular to the slit (**FIGS. 1-3**).

In re claim 17, **Muramatsu** discloses wherein the flexible substrate includes a rib (**FIG. 5: 1**), which is formed substantially perpendicular to the first slit.

In re claim 18, **Muramatsu** discloses a portion of the flexible substrate is changed in shape, thereby to form the rib (**FIG. 5**).

4. Claims 21, 24, 26, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muramatsu (JP 05-323355) in view of Kang (U.S. Patent 6,559,522) as applied to claims



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1-9, 22, 23, 25, 28, 29, and 30-35 above, and further in view of Toyosawa et al. (U.S. Pub. 2002/0033524).

In re claim 21, Toyosawa discloses wherein the flexible substrate (**FIG. 1(b): 22**) comprises at least one of a polyimide resin film (page 8, paragraphs [0112]-[0119]).

In re claim 26, Toyosawa discloses wherein the flexible substrate comprises a resin (**FIG. 1(b): 34**) on a first side of the flexible substrate, the resin including a first heat expansion coefficient.

In re claim 27, Toyosawa discloses wherein the flexible substrate comprises a solder resist (**FIG. 1(b): 31**) on a second side of the flexible substrate, the solder resist including a second heat expansion coefficient. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Muramatsu, Kang and Toyosawa to provide a flex TCP semiconductor device with high manufacturing yield (Abstract).

In re claim 24, there is no evidence indicating the warpage percentage of the tape carrier type semiconductor substrate device is critical and it has been held that it is not inventive to discover the optimum or workable percentage of a result-effective variable within given prior art conditions by routine experimentation. See MPEP§2144.05. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

***Response to Amendment***

***Response to Arguments***

5. Applicant's arguments with respect to claims 1-11, 13-15, 17, 18, and 21-35 have been considered but are moot in view of the new ground(s) of rejection.

In response to Applicant's amendment that Muramatsu fails to teach or suggest, including the flexible substrate includes a first slit for releasing stress, the first slit having a connector situated intermediate thereto for connecting both sides of the first slit to reduce warpage, and a second slit having no connector, for folding the flexible substrate as recited in the independent claims, examiner respectfully disagree. Since the Applicant's amendment necessitated the new ground(s) of rejection presented in this Office Action, Applicant is directed to pages 2 and 3 presented in this Office Action, where the newly discovered reference Kang (U.S. Patent 6,559,522) in combine with Muramatsu (JP 05-323355) discloses the claimed invention. For this reason, examiner holds the rejection proper.

***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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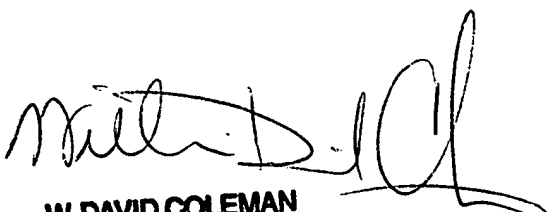
mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (571) 272-1865. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (571) 272-1855. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.  
February 25, 2004

  
**W. DAVID COLEMAN**  
**PRIMARY EXAMINER**